

Aerosol Remote Sensing From Space

Determination of Atmospheric Aerosol Properties Using Satellite Measurements; Bad Honnef, Germany, 16–19 August 2009

Aerosol optical depth (AOD), a measure of how much light is attenuated by aerosol particles, provides scientists information about the amount and type of aerosols in the atmosphere. Recent developments in aerosol remote sensing was the theme of a workshop held in Germany. The workshop was sponsored by the Wilhelm and Else Heraeus Foundation and attracted 67 participants from 12 countries.

The workshop focused on the determination (retrieval) of AOD and its spectral dependence using measurements of changes to the solar radiation back-scattered to space. The midvisible AOD is usually applied to define aerosol amount, while the size of aerosol particles is indicated by the AOD spectral dependence and is commonly expressed by the Angstrom parameter. Identical properties retrieved by different sensors, however, display significant diversity, especially over continents. A major reason for this is that the derivation of AOD requires more accurate determination of nonaerosol contributions to the sensed satellite signal than is usually available. In particular, surface reflectance data as a function of the viewing geometry and robust cloud-clearing methods are essential retrieval elements. In addition, the often needed assumptions about aerosol properties in terms of absorption and size are more reasons for the discrepancy between different AOD measurements.

Algorithms for AOD retrieval from various satellite instruments were presented at the workshop. Results were compared among AOD retrievals and with quality

references provided by ground-based Sun photometry. Central to the discussions were accuracy assessments of popular aerosol satellite products by the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Multiangle Imaging Spectroradiometer (MISR). Their overall performance is similar, with MISR performing better over land and MODIS performing better over oceans. Standard deviations for AOD on a global annual average basis are assessed at 25% over oceans and 75% over continents. However, accuracy differs on a regional and seasonal basis, and temporally and spatially more stratified error assessments are needed for meaningful applications in modeling (e.g., data assimilations).

In a comparison involving all sensor data, retrieval performances were investigated in a blind test with synthetic data. Best performances were achieved by sensors with multiangular and polarimetric capabilities. This includes retrievals with the underexploited Polarization and Directionality of the Earth's Reflectances (POLDER) sensor. With fewer a priori assumptions, higher accuracy (e.g., through a better surface characterization) and more details (e.g., spherical and non-spherical aerosol) in the aerosol retrievals are possible.

Other topics of discussion included the benefits of multiangular observations, observations of polarized signals, added value by active (lidar; light detection and ranging) remote sensing methods to provide data on the vertical distribution of aerosol particles, and effects of environment (e.g., surface properties, neighboring

clouds) or a priori assumptions (e.g., the spherical shape of aerosol particles) on aerosol retrieval.

The workshop was conducted in a collegial atmosphere and was well received by all participants. Strong enthusiasm was voiced to repeat such a focused workshop on aerosol remote sensing on a regular basis. This meeting would not have been possible without the considerable financial and

organizational support of the Wilhelm and Else Heraeus Foundation. All oral presentations are accessible at <http://www.iup.uni-bremen.de/~hoeyning/>.

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M E E T I N G A N N O U N C E M E N T S

■ 22–23 April 2010 **Tenth Netherlands Aardwetenschappelijk Congress**, Koningshof, Veldhoven, Netherlands. Sponsors: Netherlands Organization for Scientific Research; Royal Geological and Mining Society of the Netherlands (KNGMG). (H. Hilhorst, Darwin Center for Biogeology, P.O. Box 80025, Utrecht NL-3508, Netherlands; Tel.: +31-0-30-253-5169; Fax: +31-0-30-253-3486; E-mail: nac10@geo.uu.nl; Web site: <http://www.kngmg.nl/>)

The conference aims to bring together all fields of research within the Earth sciences in the Netherlands. Abstract deadline is 15 February.

■ 31 May to 4 June 2010 **Third Joint Congress of the Canadian Meteorological and Oceanographic Society and the Canadian Geophysical Union (CMOS/CGU)**, Ottawa, Ontario, Canada. Sponsors: CMOS; CGU. (Conference Secretariat, CMOS, 200 Kent St., 10th Floor, Stn. 10E236, Ottawa, ON K1A 0E6, Canada; Tel.: +1-613-990-0300; E-mail: corsec@cmos.ca; Web site: <http://www.scmo.ca/congress2010/indexe.html>)

The congress will feature sessions and workshops on the theme of "Our Earth, Our Air, Our Water: Our Future." Abstract deadline is 17 February.

■ 8–10 June 2010 **67th Eastern Snow Conference: Here Today Gone Tomorrow, the Eastern North America Cryosphere**, Hancock, Massachusetts, USA. Sponsors: U.S. Army Cold Regions Research and Engineering Laboratory; Geonor, Inc.; Campbell Scientific. (M. Pelto, P.O. Box 5000, Nichols College, Dudley, MA 01571, USA; E-mail: mspelto@nichols.edu; Web site:

http://www.easternsnow.org/annual_meeting.html)

The program will include sessions on theoretical, experimental, and operational studies of snow, ice, and winter hydrology. Abstract deadline is 5 March.

■ 2–4 March 2010 **Savanna Remote Sensing Workshop**, Fort Collins, Colorado, USA. Sponsor: NASA. (N. Hanan, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523, USA; Tel.: +1-970-491-0240; Fax: +1-970-491-1965; E-mail: Niall.Hanan@colostate.edu; Web site: <http://www.nrel.colostate.edu/projects/srs/>)

The workshop will focus on current challenges and future opportunities in remote sensing of savannas. A goal is to develop plans for a potential future NASA field campaign aimed at improving the application of remote sensing in the measurement, monitoring, and management of global savanna biomes.

■ 20–24 June 2010 **10th International Multidisciplinary Scientific Geo-Conference and Expo (SGEM 2010)**, Albena, Bulgaria. Sponsors: Bulgarian Academy of Sciences; Academy of Sciences of the Czech Republic; Latvian Academy of Sciences; others. (V. Nikolova, 14, Kliment Ohridsky Blvd., Sofia 1797, Bulgaria; Tel.: +359-2-975-3982; Fax: +359-2-817-2477; E-mail: sgem@sgem.org; Web site: <http://www.sgem.org>)

Topics will include structural geology and tectonics, groundwater exploration and management, earthquake engineering and seismology, and methods and technologies in geodesy and mine surveying. Abstract deadline is 10 March.